

GILIA AND IPOMOPSIS (POLEMONIACEAE) IN TEXAS

LLOYD H. SHINNERS

Southern Methodist University, Dallas 22, Texas

During May, 1963, Dr. Edgar T. Wherry spent two half-days at the SMU Herbarium in connection with an account of the Polemoniaceae of Texas now in preparation. Until his visit I did not know that he had undertaken such a project, and as part of the preliminary work for my own concise flora of the state had prepared keys to the genera and species (except *Phlox*) and worked over the nomenclature a year and a half earlier. My manuscript sketch includes two new species of *Gilia* and two new nomenclatural combinations under *Ipomopsis*. It is primarily to publish these and make them available for Dr. Wherry's use (or rejection, as the case may be) that this brief paper has been prepared. Since no keys to the Texas representatives as currently understood are available, and since the listings in Gould's recent *Texas Plants* leave much to be desired, it seems worth while to include my key to the genera and notes on the species (other than *Phlox*). It has been my usual procedure to work up various groups on the basis of collections at SMU to the extent of revising the nomenclature, checking relevant publications, and preparing utility keys for identification of flowering material; then put the manuscript notes aside until additional material has accumulated, or visits can be made to other institutions, or loans obtained for further study. What is presented here is not yet in the form in which it will appear in my flora, but it includes the essential material and should be of some use. The sequence of genera is that of Verne Grant's very helpful *Natural History of the Phlox Family*, vol. 1. Technical definitions of the genera may be found there; the key below is intended merely to permit rapid identification of flowering material.

KEY TO TEXAS GENERA OF POLEMONIACEAE

- 1a. Leaves pinnately compound, with distinct, broad leaflets
 - 2. *Polemonium*
- 1b. Leaves simple, but in some species cut into narrowly lanceolate to thread-like segments
 - 2a. Lower or all leaves opposite
 - 3a. Calyx enclosed by large, spiny-toothed, net-veined bracts
 - 1. *Loeselia*
 - 3b. Calyx with entire, 1-ribbed bracts or none (subtended by upper leaves in some species)
 - 4a. Leaf blades linear to oblong-ovate or obovate, entire, more than 1.3 mm. wide; annuals or perennials, general distribution . .
 - 3. *Phlox*

- 4b. Leaf blades linear to thread-like or cut into thread-like segments less than 1.3 mm. wide; small annuals of desert areas, Trans-Pecos 7. *Linanthus*
- 2b. Leaves alternate or basal
- 5a. Corolla appearing rotate (tube very short), or narrowly funnel-form with tube flaring upward 4. *Gilia*
- 5b. Corolla more or less salverform, with nearly cylindrical tube longer than the lobes
- 6a. Calyx and upper leaves sparsely woolly, or without woolly hairs 5. *Ipomopsis*
- 6b. Calyx and base of upper leaves largely hidden by matted, woolly hairs 6. *Eriastrum*

1. LOESELIA. The Mexican L. SCARIOSA (Martens & Galeotti) Walpers has been reported by Standley (1937) from the Chisos Mountains, southern Brewster County. I have not seen specimens. That cited by Standley was collected in August.

2. POLEMONIUM. P. PAUCIFLORUM S. Watson (including P. *Hinckleyi* Standley, Amer. Midl. Nat. 18: 684, 1937; according to Verne Grant, 1959) occurs in the Davis Mountains, Jeff Davis County. Flowering in August.

3. PHLOX. P. *bifida* var. *induta* Shinnery, S.W.Nat. 6: 50—51, 1961, is referred by Dr. Wherry to his P. *oklahomensis*. This latter is regarded by Marsh (1960) as specifically distinct from P. *bifida*. Marsh's paper appeared while my note was in press. By a similar curious coincidence, *Phlox Johnstonii* Wherry (1961) was published after Erbe and Turner's biosystematic study of annual species (1962) had been completed but before it appeared in print. P. *Johnstonii* is excessively close to P. *Drummondii* var. *McAllisteri*. Despite their use of modern techniques, the study of Erbe and Turner is more superficial than that of Dr. Eula Whitehouse (1945), which remains the classical work on the annual species. The genus is both large and very difficult in Texas, and I have not yet completed even a preliminary account.

4. GILIA and 5. IPOMOPSIS. See below.

6. ERIASTRUM. E. DIFFUSUM (Gray) H. L. Mason, Madrono 8: 76. 1945. *Gilia filifolia* var. *diffusa* Gray, Proc. Amer. Acad. 8: 272. 1870. "Fort Mohave and Nevada to New Mexico and the borders of Texas." Cited by Craig (1934) from El Paso and Fort Bliss, both in El Paso County. The following collections are at SMU. EL PASO CO.: Frontera (El Paso), hills and rocky places, Charles Wright, 30 March 1852. Lower slopes of Mt. Franklin, El Paso, sandy soil, Barton H. Warnock 10349, 19 April 1952. HUDSPETH CO.: steep rocky (igneous) slopes, north end of Quitman Mts., 8 miles W. of Sierra Blanca, Rogers McVaugh 8026, 21 April 1947.

7. LINANTHUS, the white-flowered L. BIGELOVII (Gray) Greene is

known from EL PASO CO.: Frontera (El Paso), Charles Wright, April 1852 (SMU). The yellow-flowered *L. AUREUS* (Nuttall) Green is said to extend east to Texas by Kearney & Peebles (1960); I have not seen specimens from the state.

KEY TO TEXAS GILIA

- 1a. Corolla funnellform, with well-developed, gradually flaring tube exceeding the lobes.....1. *G. mexicana*
 - 1b. Corolla appearing rotate, the inconspicuous tube much shorter than the widely spreading lobes
 - 2a. Lower stem leaves with long, naked petioles and wide, flat blades
 - 3a. Blades of lower stem leaves slightly to much longer than broad, usually pinnately compound or deeply pinnatifid or lyrate; winter annual. Edwards Plateau and Rio Grande Plain.....2. *G. incisa*
 - 3b. Blades of lower stem leaves slightly shorter to slightly longer than broad, coarsely toothed or shallowly lobed; prennial with thick, woody root (but flowering the first year from seed, with slender taproot); Trans-Pecos mountains.....3. *G. perennans*
 - 2b. Lower stem leaves (not basal ones) sessile or subsessile or with tapered, winged-petiolar basal portion, commonly with mall, spreading lobes nearly or quite to base
 - 4a. Calyx in flower divided about half way
 - 5a. Basal leaves numerous, persistent; lower stem leaves deeply pinnatifid, the 5—7 pairs of segments mostly coarsely toothed or deeply lobed; Rio Grande Plain.....4. *G. ludens*
 - 5b. Basal leaves mostly absent at flowering time; lower stem leaves with 1—4 pairs of narrow, entire or sparingly toothed segmens; Edwards Plateau to Panhandle and Trans-Pecos
 - 6a. Lower stem leaves (not basal ones) sessile or subsessile or with leaves with progressively more slender segments
 - 5a. *G. rigidula* var. *rigidula*
 - 6b. Lower leaves with stiff, almost needle-like segments less than 1 mm. wide; upper leaves similar to lower
 - 5b. *G. rigidula* var. *acerosa*
 - 4b. Calyx in flower divided about 3/4 or more
 - 7a. Calyx 10—12 mm. long, chiefly of white, scarious tissue with narrow green bands extending from base up through center of each lobe.....6. *G. insignis*
 - 7b. Calyx 4.0—5.5 mm. long, chiefly of green tissue, the lobes with narrow, white, scarious margins.....7. *G. Stewartii*
1. *G. MEXICANA* A. & V. Grant, Aliso 3: 255—257. 1956. Type from Arizona; cited also from New Mexico (Grant and Dona Ana counties).

and Chihuahua. There are three specimens at SMU from westernmost Texas .EL PASO CO.: Frontera (El Paso), *Charles Wright*, April, 1852. Infrequent in limestone soil, McKelligon Canyon, Franklin Mts., El Paso, *Warnock 7664*, 26 March 1948. On west, lower, limestone slopes of Franklin Mts. about 2 miles west of El Paso, *Warnock 10308*, 10 April 1952.

2. *G. INCISA* Bentham in DC., Prodr. 9: 312. 1845. "In Texas (Drummond coll. 3a n. 463!)." Type material not seen. Drummond collected in the area from Galveston to Victoria and Gonzales counties, and inland as far as Milam County. This area touches the southeastern limits of the range of this species as shown by collections at SMU (county names in parentheses): Eastern Rio Grande Plain (Cameron, Kleberg, Live Oak), up the coast to Aransas County, and on the Edwards Plateau (north to Travis and San Saba, west to Val Verde), at elevations between sea level and 2,000 feet. Flowering late March—early June.

3. *G. perennans* Shinnery, sp. nov.. *G. incisae* peraffinis, sed perennans demum cum radice crasso lignoso, foliorum inferiorum caulinarum laminis brevioribus minus divisis; species monticola. HOLOTYPE: rock crevice, north fork, Guadalupe Mountains, north McKittrick Canyon, Culberson Co., Texas, *D. S. Correll 13958*, 18 August 1946 (SMU). "Flowers blue." The following additional specimens have been seen, all from Trans-Pecos Texas at elevations of 5,000 feet or above, all deposited at SMU. CULBERSON CO.: numerous, in a spot growing in the almost solid rock of the creek bed in north McKittrick Canyon, Guadalupe Mountains, *L. C. Hinckley & Leon Hinckley 29*, 3 June 1949. In limestone soil above Hunter Lodge, in south McKittrick Canyon of Guadalupe Mts., *Warnock 9536*, 31 August 1950. Same locality, *Warnock 10950*, 3 August 1952. JEFF DAVIS CO.: infrequent in Limpia Canyon at mouth of Wild Rose Pass, Kokernot Ranch, Davis Mts., *Warnock & F. M. Churchill 7742*, 6 April 1948.

This differs from *G. incisa* more in its biology than in its morphology, and it is only after considerable hesitation that it is named as a distinct species. In addition to the points noted in the key, the calyx averages slightly larger (4.0—4.7 mm. long vs. 3.5—4.5 mm. in *G. incisa*). The fact that all but one of the collections were made in summer, long after the normal flowering time for *G. incisa*, is partly due to accidents of collecting, since most botanists have visited during the summer, but in part it doubtless reflects the higher altitude.

4. *G. ludens* Shinnery, sp. nov. Perennis? humilis (ca. 12-21 cm.) plerumque pluricaulis ramosa minute glanduloso-pubescent. Folia radicalia brevissima petiolata oblanceolata pinnatisecta incisae dentata, caulina minora sessilia lobis angustioribus suprema lobis filiformibus. Flores subcongesto-cymosae; inter *G. incisam* et *G. rigidulam* ludens. HOLOTYPE: silt loam, railroad right-of-way, 4 miles west of Alice, Jim Wells Co., Texas, *Shinnery 19581*, 10 April 1955. (SMU). "Corolla blue (flowers

mostly past)." PARATYPES (all SMU). DUVAL CO.: in Pleistocene gravel, State Highway 44. 7 miles east of Freer, *Rebecca M. Rodriguez* 105, 18 March 1962. In sandy loam, U.S. Highway 44, 2 miles west of San Diego, *Jesus H. Ramirez, Nick Lopez, and Wm. McCart* 8767, 10 March 1963. WEBB CO.: in light red sand, State Highway 359, 2 miles west of Bruni, *Elvira G. Garcia* 137, 16 March 1963.

Because of the prominent, flat-bladed basal leaves, I at first mistook this for *G. incisa*, despite the relatively short-pedicelled flowers. On later comparison in the herbarium, it seemed closer to *G. rigidula*, but that species lacks the prominent basal leaves and is confined to areas from the Edwards Plateau north and west. Bentham's description of the leaves of *G. incisa* (he apparently had only upper ones) as "cuneatis lanceolatis linearibus subintegris v. saepius acutissime incisus" makes it certain that he did not have the species here described.

5. *G. RIGIDULA* Bentham in DC., Prodr. 9: 312. 1845. "In Texas pr. Bejar (Berlandier)." This often-mentioned locality is the present San Antonio, Bexar County. The description and locality are quite sufficient to establish the identity of Bentham's plant. I follow Asa Gray in recognizing two varieties.

5a. *G. RIGIDULA* var. *RIGIDULA*. Edwards Plateau, north to Travis, Burnet, Jones, Taylor and Mitchell counties, west into eastern Trans-Pecos (Pecos, Reeves, Val Verde). Flowering late March—May, sporadically to October.

5b. *G. RIGIDULA* var. *ACEROSA* Gray, Proc. Amer. Acad. 8: 280. 1870. "North New Mexico to Arizona, Fendler, Gordon, Wright, &c." (Specimens not seen.) In the Synoptical Flora the range is extended to "borders of Texas" (p. 149). Northern Trans-Pecos (Culberson, Hudspeth, Jeff Davis) and Panhandle, southeast to Taylor County. Flowering late March (rarely) or April to September.

6. *G. INSIGNIS* (Brand) Cory & Parks, Cat. Fl. Texas (Texas Agr. Exp. Sta. Bull. 550) p. 85. 1938 ("1937"). *G. rigidula* ssp. *insignis* Brand, Pflanzenreich IV. 250. p. 149. 1907. "So nur in Nord-Mexiko: Coahuila Pringle n. 248; Palmer n. 843)." Specimens not seen. Verne Grant provisionally referred this and the next to *G. rigidula*, but I feel sure this was simply due to not having seen adequate material. The different calyx (as noted in the key), the very large corolla, and persistent, large basal leaves (somewhat like those of *G. ludens*) justify treating this as a distinct species. I have seen two collections, both from BREWSTER CO.: abundant especially along road; stony flats, creosote shrub association, about 3 miles S. of Persimmon Gap, *McVaugh* 7831, 5 April 1947 (SMU). Frequent along roadside near Dog Flat, *Warnock* 21485, 2 April 1938.

7. *G. STEWARTII* I. M. Johnston, Journ. Arnold Arb. 24: 94. 1943. Cited by Johnston from Brewster and Hudspeth counties, and from numerous localities in Mexico. I have seen the following Texas collec-

tions. BREWSTER CO.: frequent on limestone hills between Lone Mountain and Nugent Mountain, Big Bend National Park, Warnock 7161, 3 Sept. 1947. On alluvial fan, 6 miles north of Hot Springs, Big Bend Park, Rose-Innes & Warnock 546, 20 March 1941 (cited by Johnston). PRESIDIO CO.: calcareous gravel hillsides, south end of Van Horn Mts. near Porvenir, U. T. Waterfall 4754, 26 June 1943 (det. I. M. Johnston). Along rocky ledge e. Van Horn Creek at north end crossing, Porvenir-Chispa road in western end of county, L. C. Hinckley 2230, 25 Oct. 1941.

Excluded Species

G. ophthalmoides ssp. *australis* A. & V. Grant, Aliso 3: 263. 1956. Described from southern Arizona and southwestern New Mexico; reported by Gould from Trans-Pecos Texas, but I have seen no specimens.

G. ophthalmoides ssp. *flavocincta* (A. Nelson) A. & V. Grant, 1. c. 262. Cited by the Grants only from Arizona; reported by Gould for the entire western half of Texas, but I have seen no specimens.

KEY TO TEXAS IPOMOPSIS

- 1a. Corolla tube 0.3—1.0 cm. long
 - 2a. Leaves all entire 8. *I. Wrightii*
 - 2b. Leaves (except uppermost) toothed or divided into linear or thread-like segments
 - 3a. Corolla lobes 5—7 mm. long, more than half as long as the tube
1. *I. Havardii*
 - 3b. Corolla lobes 1.0—4.5 mm. long, less than half as long as the tube
 - 4a. Annual with slender taproot, flowering April—early July; desert flats
 - 5a. Corolla tube 3—5 mm. long; upper leaves deeply toothed or pinnatifid, the segments short and wide ... 6. *I. polycladon*
 - 5b. Corolla tube 6—8 mm. long; upper leaves entire or cut into 3—5 thread-like segments 7. *I. pumila*
 - 4b. Perennial with rather stout taproot, flowering July—October; mountains
 - 6a. Primary axis of inflorescence with about 1—10 nodes, the lower flowering branchlets mostly subtended by reduced undivided leaves (see excluded species at end) ... *I. multiflora*
 - 6b. Primary axis of inflorescence with about 10—35 nodes, the lower flowering branchlets mostly subtended by pinnatisect leaves (see excluded species at end) *I. pinnata*
- 1b. Corolla tube 1.2—4.5 cm. long
 - 7a. Inflorescence loose, open, broad; stem freely and widely branching; corolla lavender-blue to white
 - 8a. Corolla tube 1.2—2.0 cm. long; corolla lobes 3—6 mm. long, 1.0—3.2 mm. wide 2. *I. laxiflora*
 - 8b. Corolla tube 2.2—4.5 cm. long; corolla lobes 6.5—12.0 mm. long, 4—6 mm. wide 3. *I. longiflora*

7b. Inflorescence narrow, dense, elongate; stem normally simple or with few, elongate branches; corolla red or rarely yellow

9a. Calyx lobes about as long as the tube; Trans-Pecos

4. *I. aggregata*

9b. Calyx lobes nearly twice as long as the tube: central and eastern Texas..... 5. *I. rubra*

1. *I. HAVARDII* (Gray) V. Grant, *Aliso* 3: 357. 1956. *Loeselia Havardi* Gray, Proc. Amer. Acad. 19: 87. 1883. "W. Texas, on the Rio Grande near Presidio del Norte, Dr. N. (sic) Havard, 1881." *Gilia Havardi* Gray, Syn. Fl. 2 pt. 1 (suppl.) p. 411. 1886. I have seen only the following specimens. BREWSTER CO.: limestone soil in Avery Canyon, Big Bend National Park, Warnock 9141, 23 July 1950. PRESIDIO CO.: about 1 mile southeast of Greenwood ranchhouse some 50 miles south of Marfa, L. C. Hinckley 3578, 4 April 1946. Common along washes, rolling Rio Grande Plain, 4 miles SE of Ruidosa, C. H. Muller 8440, 28 July 1945.

2. *I. LAXIFLORA* (Coulter) V. Grant, *Aliso* 3: 361. 1956. *Gilia Macombii* var. *laxiflora* Coulter, Contrib. U.S. Nat. Herb. 1: 44. 1890. "Camp Charlotte (Ixion county)," (i. e. Irion County), G. C. Nealley 311 (US; not seen). *Gilia laxiflora* (Coulter) Osterhout, Bull. Torr. Bot. Club 24: 51. 1897. Trans-Pecos (Jeff Davis, Presidio, Reeves), east in South Plains to Lubbock and Mitchell counties. Flowering late April—July.

3. *I. LONGIFLORA* (Torrey) V. Grant, *Aliso* 3: 361. 1956. *Cantua longiflora* Torrey, Ann. Lyc. N.-Y. 2: 221. 1826. "On the Canadian" (probably in the Texas Panhandle). *Gilia longiflora* (Torrey) G. Don, Gen. Hist. Dichlam. Pl. 4: 45. 1838. Widespread in Trans-Pecos, Panhandle, South Plains and Red Plains, east to Wilbarger and Stonewall counties. Flowering late March (Big Bend area) or April to October.

4. *I. AGGREGATA* (Pursh) V. Grant var. *texana* (Greene) Shinnery, comb. nov. *Callisteris texana* Greene, Leaflet Bot. Obs. & Crit. 1: 160. 1905. "Guadalupe Mountains, western Texas, V. Havard, Sept., 1881. Type in U. S. Nat. Herb." (not seen). *Gilia aggregata* var. *texana* (Greene) I. M. Johnston, Journ. Arnold Arb. 24: 95. 1943. This is listed twice by Gould, as *Gilia texana* and as *Ipomopsis aggregata*. Common in the Trans-Pecos mountains in Brewster, Culberson, Jeff Davis and Presidio counties. Flowering July—September.

5. *I. RUBRA* (L.) Wherry, *Bartonia* 18: 56. 1936. *Polemonium rubrum* L., Sp. Pl. 1: 163. 1753. "Habitat in Carolinae citerioris arenosis. B. Jussieu." *Gilia rubra* (L.) Heller, Bot. Expl. S. Texas (Contrib. Herb. Franklin & Marshall College 1) p. 81. 1895. Local and uncommon in eastern counties in the Pine Belt; frequent and locally abundant on various substrates, often on dry, rocky, limestone slopes, in central Texas west to Taylor and Scurry counties and southwest to Caldwell County. Also frequent in cultivation. Flowering late May—early July, and spora-

dically to September. A semi-albino with yellow flowers has been observed in Rockwall County.

This is an example of a species first described from the Southeastern United States but relatively uncommon there, having its center of abundance west of the Mississippi River. *Mirabilis albida* and *Hedyotis nigricans* are other examples of such distribution. These are all of Southwestern and Mexican relationship; I would not agree with Verne Grant in describing *Ipomopsis rubra* as characteristic of the Southeast.

6. I. POLYCLADON (Torrey) V. Grant, *Aliso* 3: 361. 1956. *Gilia polycladon* Torrey in Emory, Rept. U.S. & Mex. Boundary Survey 2: 146. 1859. "Stony hills near El Paso, March." No collector is named; the following is the only specimen seen. EL PASO CO.: Frontera (El Paso), Gravelly places, Charles Wright, April 1852.

7. I. PUMILA (Nuttall) V. Grant, *Aliso* 3: 361. 1956. *Gilia pumila* Nuttall, Journ. Acad. Nat. Sci. Phila. (ser. 2) 1: 156. 1848. "Near the first range of the Rocky Mountains of the Platte. Flowering in May. (Nuttall.)" In Texas confined to the Trans-Pecos. CULBERSON CO.: near Salt Lake on Highway 54, about 30 miles north of Van Horn, Eula Whitehouse 11455, 5 July 1931. HUDSPETH CO.: only four plants found in barpit at roadside about 5 miles S. Sierra Blanca, Hinckley & Hinckley 68, 12 June 1949. PRESIDIO CO.: sandy desert flats, 2 miles north of Porvenir; abundant, McVaugh 7995, 17 April 1947.

8. I. **Wrightii** (Gray) Shinnars, comb. nov. (This appears as a *nomen nudum* without indication of combining author in Gould's *Texas Plants*, 1963.) *Gilia Wrightii* Gray, Proc. Amer. Acad. 8: 273. 1870. "Western frontiers of Texas, on the Rio Grande forty miles below El Paso, C. Wright, n. 496." Two collections seen, the first from the general area of the type locality. EL PASO CO.: in sandy soil along road about 15 miles north of Ysleta, W. J. Tebeaux, 13 Aug. 1951. Rather infrequent in deep sand along Carlsbad highway about 16 miles east of El Paso, Warnock 10902, 28 July 1952. Annual developing a stout taproot; Gray described the species as doubtfully perennial.

Excluded species

I. multiflora (Nuttall) V. Grant, *Aliso* 3: 357. 1956. *Gilia multiflora* Nuttall. Gray in 1870 (Proc. Amer. Acad. 8: 260) stated that *Collomia Cavanillesiana* occurred on "borders of W. Texas, New Mexico, Arizona and adjacent Mexico." In the first edition of the Synoptical Flora (vol. 2 pt. 1: 136, 1878), he reports it from "New Mexico and W. Texas to Arizona." In the Supplement added to the 2nd edition (p. 411, 1886), this name is given as a synonym "in part" of *Gilia multiflora*, which is stated to be "common in New Mexico and Arizona." Presumably the earlier report of Texas was found to be in error. I have seen specimens from New Mexico and Arizona, but not from Texas.

I. pinnata (Cavanilles) V. Grant, *Aliso* 3: 357. 1956. *Phlox pinnata* Cavanilles, *Icones* 6: 17, t. 528 fig. 1. 1801. "Habitat in Montevideo viciniis, . . . *Phlox* haec *pinnata* crescit etiam passim in Nova Hispania prope Real del Monte." Benth and Gray were certainly correct in believing that the locality Montevideo was an error (cf. Gray, 1870, p. 260, where it is erroneously given as "Buenos Ayres"). *Collomia Cavanillesiana* G. Don, *Gen. Hist. Dichlam.* Pl. 4: 247. 1838. (Illegitimate new name based on the preceding.) *Gilia pinnata* (Cavanilles) Brand, *Pflanzenreich* IV. 250. p. 112. 1907. Specimens seen from Chihuahua, Durango and Zacatecas. It is not unlikely that this species may be found in the Big Bend area of Texas.

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